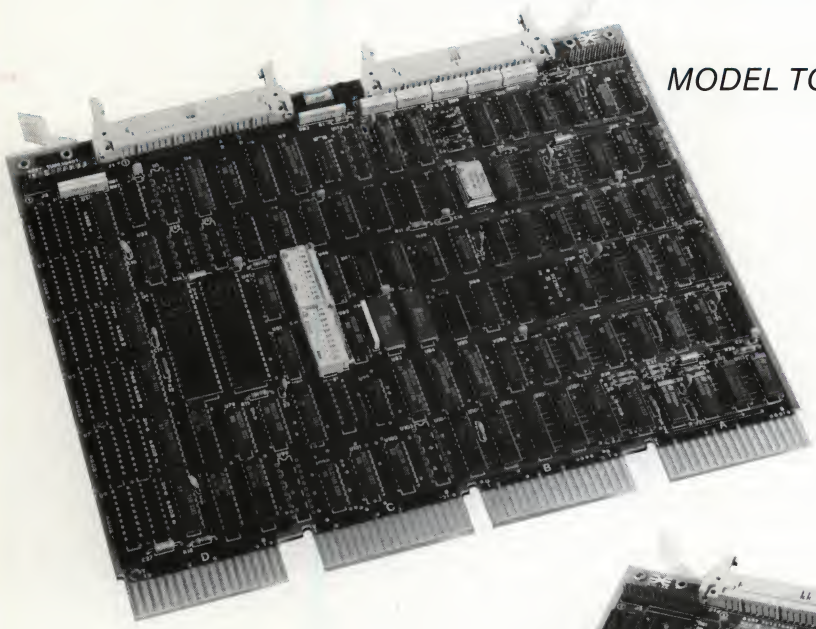
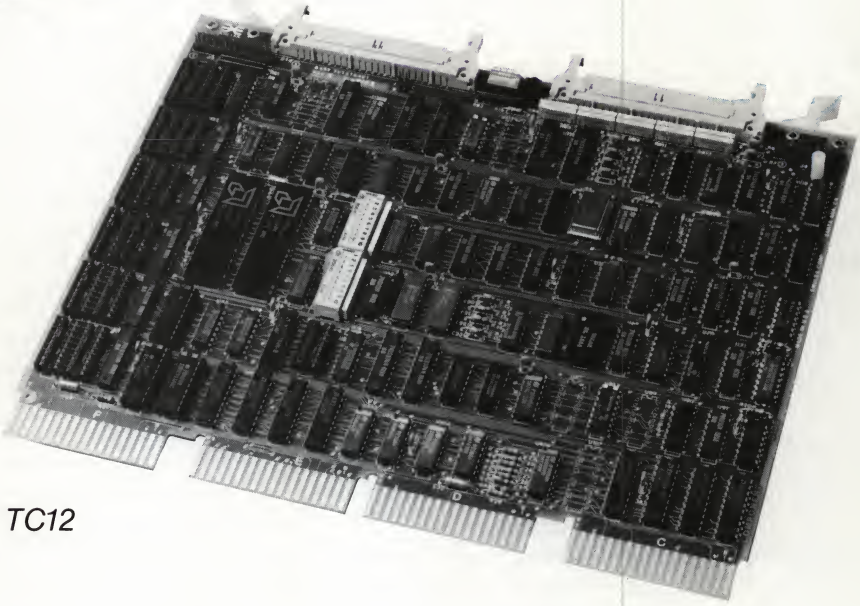
EMULEX

THE GENUINE ALTERNATIVE FOR VAX*/PDP/LSI-11 TAPE CONTROLLERS

EMULEX TC02 AND TC12 SERIES TS11 COMPATIBLE



MODEL TC02



MODEL TC12

FINALLY A UNIVERSAL TAPE COUPLER...

...with DEC TS11 diagnostic/software transparency and standard operating system support across the LSI-11, PDP-11, and VAX-11* CPU lines. Best of all, it handles industry-standard half inch tape transports — conventional start/stop, streaming, and the new generation of GCR units. Compactly packaged on a single quad height board with low power consumption and super high reliability. And backed up with worldwide support and the EMULEX brand of quality.

*DEC, LSI, PDP, VAX, VMS, Unibus, and Q Bus are trademarks of Digital Equipment Corporation.

EMULEX

THE INDUSTRY'S FIRST TS11 COMPATIBLE TAPE COUPLER SERIES...

...provides software compatibility with DEC's newest half-inch magnetic tape subsystem. And at the same time, opens a whole range of new applications and product configurations from which to choose. With these exceptional new products, you get the advantages of:

INCORPORATING essentially all industry compatible, half-inch formatted tape drives — including conventional NRZI/PE start/stop; 1600/3200 bpi start/stop/streaming; and the new breed of low-cost GCR (6250 bpi) start/stop/streaming transports coming soon from the leading independent manufacturers.

EXECUTING standard diagnostics and system software under all major DEC operating systems — including RT11, RSX11M, RSX11M PLUS, RSTS/E and VMS — supported across the LSI/PDP/VAX-11 line.

BACKING UP fixed media (Winchester) disk drives with EMULEX-supported software for streaming type tape transports.

EMBEDDING the coupler in any quad slot of a standard Unibus or Q Bus backplane or system unit.

LIKE ALL EMULEX CONTROLLERS...

...the TC02 for LSI-11's, and the TC12 for PDP/VAX-11's, incorporate the same modern bipolar microprocessor technology first introduced by EMULEX, then perfected and proven in the many thousands of units already shipped. Use of this technology results in a product line with full flexibility, optimum packaging, outstanding reliability, extra features, and high performance.

COMPARE THIS COMBINATION OF KEY FEATURES AGAINST THOSE OF ANY OTHER PRODUCT...

...and we think you will agree that the TC02 and/or TC12 are the best choices for meeting all your LSI/PDP/VAX-11 tape subsystem requirements.

COMPACT PACKAGING. Each unit is contained on only one stand-alone quad height pc board which plugs into any standard Unibus SPC or Q Bus quad slot.

TRANSPARENT SOFTWARE OPERATION. The coupler, combined with one to four standard formatted tape drives, emulates all functions of the DEC TS11 subsystem, including execution of standard diagnostic programs.

INTERNAL SELF-TEST. The coupler automatically performs extensive diagnostic tests during power-up and flags detected errors with a fault LED indicator.

FLEXIBLE TRANSPORT INTERFACE. The coupler handles all industry standard ("Pertec interface") drives incorporating embedded or integral formatters. Up to four similar type transports (i.e. start/stop or streamer) may be daisy-chained on a single coupler.

HIGH PERFORMANCE. Each coupler is designed to handle tape data rates to 250,000 characters per second. This permits operation with high-performance transports, including: 1600 bpi @ 125 ips; 3200 bpi @ 50 ips; and 6250 bpi @ 25 ips.

STANDARD CPU BUS INTERFACE. The coupler interfaces to any standard quad bus slot and presents only one unit load on all lines. Full 16-bit word NPR data transfers are made, and the controller checks for bus parity errors if a parity controller is installed in the system. The TC02 interfaces via the Q Bus A–B connectors; the TC12 interfaces via SPC connection on the Unibus C–F connectors.

FLEXIBLE FORMATTING. Data may be packed in either DEC or IBM 9-channel format. Tape drives may be daisy-chained together. User may edit previously recorded records.

COUPLER/TRANSPORT DATA INTEGRITY. Data parity is generated and checked on all transfers between the coupler and the tape transport with errors reported by status bits.

4 MEGABYTE Q BUS ADDRESS. The TC02 has full 22-bit Q Bus address hardware implemented for permitting EMULEX streaming software and/or custom drivers to utilize the full 4 MByte memory capacity of the LSI-11/23 PLUS.

FOR STREAMING BACKUP OF WINCHESTER DISKS...

...you're supported across the entire LSI-11, PDP-11 and VAX-11 series of CPU's. On the LSI-11 and PDP-11 series, a stand-alone disk/tape backup program — written and supported by EMULEX — is provided. This package provides physical media backup for *all* EMULEX and DEC hard disk subsystems (except RK05 and UDA50-based subsystems) using the standard file structures of RSX11M, RSX11M-PLUS, RSTS/E and RT11.

On the VAX-11 series under VMS, the standard on-line backup utility (BACKUP) can be used with the TC12 to support tape backup operations for applicable EMULEX and DEC hard disk subsystems.

THE SAME QUALITY AND RELIABILITY...

...proven in all EMULEX products is built into the TC02 and TC12. Assembly starts with exclusive use of pretested, preaged parts per MIL STD 833. All assembled units are next thoroughly tested at the component, assembly, and subsystem level. This is followed by dynamic environmental burn-in for 96 hours over a cyclic temperature range of 0-55°C. Units passing environmental tests are then subjected to a one-hundred percent QC certification test at the subsystem level. These demanding procedures yield negligible infant mortality rates on production units. Calculated MTBF's of the TC02 and TC12 exceed 60,000 hours; and complete actual failure data is maintained by EMULEX to insure that actual MTBF experience conforms to predicted results.

AND FINALLY YOU GET SUPPORT...

...from the EMULEX customer service organization and from an application staff devoted solely to customer backup. All EMULEX-supplied software is written and maintained in-house by the EMULEX engineering group, including a 90-day full-support warranty plus renewable update service, so you're never left holding the bag by unsupported packages. Direct field installation is available from EMULEX, and the products are maintained nationwide by Control Data and other qualified service organizations.

PRODUCT SPECIFICATIONS MODELS TC02 AND TC12

Characteristic	Specification
FUNCTIONAL	
Design	High-speed 8-bit bipolar microprocessor-based tape coupler for formatted tape transports.
CPU's	TC02: 11/23, 11/23-PLUS TC12: PDP-11/04 thru 11/70, VAX-11 Unibus.
Computer Interface	
TC02	Standard Q Bus via quad interface on coupler board (A-B connectors).
TC12	Standard Unibus via SPC interface on coupler board (C-F connectors).
Tape Speeds	12.5 to 125 ips.
Tape Densities (Forward & Reverse)	800, 1600, 3200, 6250 bpi.
Max Tape Data Rate	250,000 characters/second.
Standard Emulation	DEC TS11 Tape Subsystem.
Bus Address Range	TC02: 256 KBytes Standard; 0-4 MBytes optional for LSI-11/23-PLUS. TC12: 0-256 KBytes.

Characteristic	Specification
Standard Register Base Address	Variable.
Standard Interrupt Vector	Variable.
Interrupt Level	5
Tape Transports	
Start-Stop	All 9-track, 800/1600 bpi industry-standard formatted tape drives.
Streamer	Cipher-F880 and F880 II Microstreamer CDC-92181 Streaming Tape Kennedy-6809 Data Streamer Pertec-F1000 Streaming Tape.
Number of Transports	Daisy-Chain, 1-4 drives. (No mixing of start-stop and streamers.)
Coupler/Tape Bus Parity	Parity generated and checked on all byte transfers between coupler and tape transport, with errors flagged as status bits.
Self-Test	Coupler automatically executes extensive power-up self-test.
Fault/Activity Display	LED indicates detected board fault and coupler read/write activity.

EMULEX

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PRODUCT SPECIFICATIONS MODELS TC02 AND TC12 (CONTINUED)

Characteristic	Specification
Option/ Configuration Switches	Three on-board slide switch modules for Base Address, Interrupt Vector, and microcode option selection.
Adaptive Streaming	Microprocessor will detect sequences of operations that can support effective streaming and will automatically switch between streaming and start/stop modes.
PHYSICAL	
Packaging	Quad-size four layer board (TC02 and TC12).
Cabling	Two 50-conductor flat cables to first tape transport.
Adapters	Daisy-chain cable adapters available for most industry standard tape drives.
ELECTRICAL	
Computer Interface	
TC02	Standard Q Bus using DEC approved drivers and receivers; one unit load per bus line.
TC12	Standard Unibus using DEC approved drivers and receivers; one unit load per bus line.
Transport Interface	25 ma drivers used on all output lines. Max 25 feet cumulative daisy-chain cable length.
Power	
TC02	+5V ± 5%, 5 amps.
TC12	+5V ± 5%, 5.2 amps.

Characteristic	Specification
ENVIRONMENTAL	
	Exceeds all environmental ranges and conditions specified for commercial LSI-11, PDP-11, VAX-11 computers and applicable tape drives.
SOFTWARE	
LSI-11 and PDP-11 Diagnostics	TS11 Controller Logic Test — ZTSIBO TS11 Data Reliability Test — ZTSHCO
VAX Diagnostics	TS11 Subsystem Repair — EVMAD TS11 Data Reliability — EVMAA
Operating Systems	All applicable to TS11 tape system on LSI-11, PDP-11, and VAX-11; includes RT11, RSX11M, RSX11M-PLUS, RSTS/E, and VMS.
Streaming Backup LSI-11/PDP-11	EMULEX supplied physical media backup stand-alone package supports all EMULEX and DEC hard disk subsystems (except RK05 and UDA50) with standard file structures of RT11, RSX11M, RSX11M-PLUS, RSTS-E and VMS. Supports full 4 MByte memory address range on LSI-11/23-PLUS.
VAX-11	Standard on-line backup utility (BACKUP) can be used for physical backup.